

DOCUMENT RESUME

ED 066 460

TM 001 944

TITLE Manager, Retail Automotive Service (ret. tr.)
0-72.12; Proprietor-Manager, Retail Automotive
Service (ret. tr.)--Technical Report on
Standardization of the General Aptitude Test
Battery.

INSTITUTION Manpower Administration (DOL), Washington, D.C. U.S.
Training and Employment Service.

REPORT NO TR-S-298

PUB DATE Mar 64

NOTE 9p.

EDRS PRICE MF-\$0.65 HC-\$3.29

DESCRIPTORS *Aptitude Tests; *Auto Mechanics (Occupation);
*Cutting Scores; Evaluation Criteria; Job Applicants;
*Job Skills; Managerial Occupations; Norms;
Occupational Guidance; *Personnel Evaluation; Test
Reliability; Test Validity

IDENTIFIERS GATB; *General Aptitude Test Battery

ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included.

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY.

FOR

MANAGER, RETAIL AUTOMOTIVE SERVICE (ret. tr.) 0-72.12
PROPRIETOR-MANAGER, RETAIL AUTOMOTIVE SERVICE (ret. tr.)

B-578 S-298

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U. S. Employment Service
in Cooperation with
Pennsylvania State Employment Service

March 1964

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

MANAGER, RETAIL AUTOMOTIVE SERVICE (ret. tr.) 0-72.12
PROPRIETOR-MANAGER, RETAIL AUTOMOTIVE SERVICE (ret. tr.)

B- 578 S-298

Summary

The General Aptitude Test Battery, B-1002B, and Kuder Preference Record, Vocational, Form CH, were administered to a final sample of 80 male Proprietor-Managers of retail automotive stations in Philadelphia, Pennsylvania. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data and their combined selective efficiency, Aptitudes G-Intelligence, N-Numerical Aptitude and Q-Clerical Perception were selected for inclusion in the final test norms.

GATB Norms for Manager, Retail Automotive Service (ret. tr.) 0-72.12, B-578 S-298
Proprietor-Manager, Retail Automotive Service (ret. tr.)

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H	100	G	Part 3	95
	CB-1-I			Part 4	
	CB-1-J			Part 5	
N	CB-1-D	90	N	Part 2	85
	CB-1-I			Part 6	
Q	CB-1-B	85	Q	Part 1	85

Effectiveness of Norms

The data in Table V indicate that only 64 percent of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 82 percent would have been good workers. 36 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 18 percent would have been poor workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Manager, Retail Automotive Service 0-72.12 (Proprieter-Manager, Retail Automotive Service).

II. Sample

The General Aptitude Test Battery, B-1002B, and Kuder Preference Record, Vocational, Form CH, were administered during the period June 1962 - July 1963 to 80 Proprieter-Managers of retail automotive service stations in Philadelphia, Pennsylvania. The names of the oil companies which leased these service stations and the corresponding number of Proprieter-Managers in the sample are as follows:

<u>Oil Company</u>	<u>No.</u>	<u>Oil Company</u>	<u>No.</u>
American	4	Mobile	2
Atlantic	14	Sinclair	5
Cities Service	13	Sun	11
Esso	12	Texaco	6
Gulf	13	Total =	80

Most oil companies which lease automotive service stations require Proprieter-Managers to have a high school education. However, if an outstanding applicant lacks a high school degree he will be considered as a leasee if he has the ability to comprehend and use elementary arithmetic in keeping books, and has at least average reading comprehension and ability to write legibly. No particular experience is required to become a Proprieter-Manager but it is desirable for applicants to have worked as a Service Station Attendant or in a similar occupation which requires dealing with the public. Inexperienced Proprieter-Managers receive three to eight weeks of formal training given by the oil company, and very close business counseling by oil company personnel for a period of approximately one year. All individuals in the sample are considered to be sufficiently experienced for valid ratings of their job performance to be made by oil company personnel.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 80	M	σ	Range	r
Age (years)	41.7	9.0	26-64	-.016
Education (years)	11.2	2.0	6-15	.159
Experience (months)	85.9	71.3	6-318	.072

III. Job Description

Job Title: Manager, Retail Automotive Service 0-72.12

Proprietor-Manager, Retail Automotive Service

Job Summary: Plans and directs the operation of an automobile service station. Determines and carries out policy; plans and carries out merchandising program; hires, trains, motivates, assigns and supervises work of employees; maintains records and handles finances; provides service to customers and supervises station maintenance. May participate in community activities.

Work Performed: Determines and carries out policy. Analyzes station location and surrounding neighborhood and makes decision as to the type of work station will perform (lubrication, washing, minor repairs, major repairs, road service, etc.). Establishes prices for all work to be performed and for each item for sale. Determines hours during which station will be open, kinds of accessories and items to be sold, supplies to be used for non-company merchandise, makes decisions on non-company charge accounts, and determines credit to be extended to customers.

Plans and sets up displays. Determines kind of advertising material to post at station, when to conduct sales campaigns and when advertising is to be done. Selects media to be used and the cost against budget allotment for advertising. May contact businesses in area to solicit firm accounts and/or employees' business. Maintains inventory control by taking periodic physical inventories for spot check and/or audit of daily inventory control. Makes sure that adequate stock is always on hand and orders needed supplies. Periodically compares business of current period with that of previous month or same period a year ago; determines cause of any decrease and plans remedial action.

Hires, trains, motivates, assigns and supervises employees. Analyzes manpower situation and determines need for new employees or replacement of employees. Establishes salaries and determines the amount of commission and/or incentive to be paid. Trains new employees in good selling techniques, approach to customer, established drive-way procedures, lube-bay procedures, and other standard operating and safety procedures. Determines hours of and number of shifts to be worked; assigns employees to shifts, work stations and responsibilities.

Maintains records and finances. Reviews previous day's report made by each shift leader and prepares daily record, making the following entries: meter readings; sales of gasoline, oil, tires, etc; cash receipts and credit charges; expenditures and commissions. Totals entries on daily record. Prepares bank deposit; makes entries in checkbook and keeps bank account in balance; checks against monthly statement. In cases of fairly large overage or shortage, checks with shift leader to trace causes. Files work tickets, company charge accounts and bills. May prepare

and send out statements to dealer charge account customers. Reviews bills, invoices, etc. and writes checks to make payments. Computes and prepares payrolls and keeps record of all payroll deductions.

Provides service to customers. Makes customer contact and handles customer requirements at pump island selling gasoline, oil, etc. Handles all complaints that cannot be satisfied by attendant. Supervises station maintenance; sees that station driveways, islands, lube and wash bays, office, restrooms and servicing tools are clean. In addition to meter reading, may take stick reading. Periodically checks for water in gas tanks by putting water detection paste on stick when taking stick reading.

NOTE: Valuable information regarding the automobile service station business may be found in the following publication which is on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, at 35 cents per copy (25 percent discount on 100 or more copies):

Small Business Administration. Starting and Managing a Service Station. The Starting-and-Managing Series, 1961, Vol. 3.

IV. Experimental Battery

All the tests of the GATB, B-1002B, as well as the Kuder Preference Record, Vocational, Form CH, were administered to the sample group.

V. Criterion

The criterion data were collected during the period May-October 1963 and consisted of two sets of ratings made by oil company district salesmen on a descriptive rating scale developed jointly by the Industrial Services staff of the Pennsylvania State Employment Service and representatives of the various oil companies participating in the study. A period of at least two weeks elapsed between the first and second ratings. The rating scale consisted of thirteen items covering different aspects of job performance, with five alternatives for each item. Weights of one through five, indicating the degree of job proficiency attained, were assigned to the alternatives. A reliability coefficient of .43 was obtained for the criterion. This low reliability coefficient was interpreted as indicating that one set of ratings was less reliable and valid than the other. In an attempt to select the better of the two sets of ratings for validation analysis, each set of ratings was correlated with the variables of age, education and experience. Since the second set of ratings correlated higher with each of these variables and significantly with the variable of experience, the first set of ratings which did not correlate significantly with either variable was selected as the final criterion. The range of final criterion scores was 20-61, with a mean of 47.5 and a standard deviation of 7.5.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Intelligence (G) - required to determine policies, plan merchandising program, and train, motivate and supervise employees.

Verbal Aptitude (V) - required to train employees in factors such as sales approach, selling techniques and other operating procedures; to make customer contacts and handle customer complaints.

Numerical Aptitude (N) - required to maintain inventory control, maintain records and finances, prepare bank deposit and to compute and prepare payrolls.

Clerical Perception (Q) - required to maintain records, file work tickets, and to handle company charge accounts and bills.

B. Quantitative Analysis: Kuder Preference Record, Vocational, Form CH

TABLE II

Means (M), Standard Deviations (σ), Percentiles (P), and Pearson Product-Moment Correlations with the Criterion (r) for the Interest Scales of the Kuder Preference Record, Vocational, Form CH

N = 80

<u>Interests</u>	<u>M</u>	<u>σ</u>	<u>P</u>	<u>r</u>
Outdoor	38.3	15.1	35	-.034
Mechanical	45.4	12.0	48	-.101
Computational	29.2	8.5	54	-.028
Scientific	40.0	9.1	49	-.035
Persuasive	47.6	13.7	70	.088
Artistic	21.8	8.1	51	.013
Literary	16.6	7.4	40	-.046
Musical	12.3	6.0	54	.139
Social Service	43.7	12.4	55	.046
Clerical	44.4	12.5	47	-.355

Kuder interest scale scores which convert to at least the 75th percentile (the percentile equivalent in the general population) are interpreted as indicating high regard for performing activities in a particular area. The Kuder interest scales were not considered for inclusion in the final test norms for this study since (1) none of the above mean scores converts to the 75th percentile, and (2) none of the above correlation coefficients shows a significant positive correlation for the relationship between an interest scale and the criterion.

C. Quantitative Analysis: GATB

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 80

Aptitudes	M	σ	r
G-Intelligence	100.9	14.7	.399**
V-Verbal Aptitude	96.6	13.0	.327**
N-Numerical Aptitude	102.6	15.2	.246*
S-Spatial Aptitude	101.8	20.8	.325**
P-Form Perception	93.0	19.5	.183
Q-Clerical Perception	98.2	13.4	.367**
K-Motor Coordination	98.0	16.0	.062
F-Finger Dexterity	92.2	17.2	.167
M-Manual Dexterity	95.2	18.1	.096

D. Selection of Test Norms:

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes									
	G	V	N	S	P	Q	K	F	M	
Job Analysis Data										
Important	X	X	X			X			X	
Irrelevant										
Relatively High Mean	X		X	X						
Relatively Low Sigma	X	X				X				
Significant Correlation with Criterion	X	X	X	X		X				
Aptitudes to be Considered for Trial Norms	G	V	N	S		Q				

Trial norms consisting of various combinations of Aptitudes G, V, N, S and Q with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of G-95, N-85 and Q-85 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 36 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table V shows the relationship between test norms consisting of Aptitudes G, N and Q with critical scores of 95, 85 and 85, respectively, and the dichotomized criterion for the experimental sample. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for
Manager, Retail Automotive Service 0-72.12
Proprietor-Manager, Retail Automotive Service
(G-95, N-85, Q-85)

N = 80	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	10	41	51
Poor Workers	20	9	29
Total	30	50	80

Phi Coefficient = .49
 $\chi^2 = 19.200$
 $P/2 < .0005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, N and Q with minimum scores of 95, 85 and 85, respectively, have been established as B-1002 norms for Manager, Retail Automotive Service 0-72.12 (Proprietor-Manager, Retail Automotive Service). The equivalent B-1001 norms consist of G-100, N-90 and Q-85.

IX. Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation into OAP-9 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962.